

03-R-313^a, The Center for Integrated Nanotechnologies (CINT) Facility, Sandia National Laboratories Albuquerque, New Mexico, and Los Alamos National Laboratory, Los Alamos, New Mexico

(Changes from FY 2005 Congressional Budget Request are denoted with a vertical line in the left margin.)

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost (\$000)	Total Project Cost (\$000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2004 Budget Request (Preliminary Estimate).....	3Q 2002	2Q 2004	3Q 2004	3Q 2007	73,800	75,800
FY 2005 Budget Request (Performance Baseline).....	4Q 2002	2Q 2004	1Q 2004	3Q 2007	73,800	75,800
FY 2006 Budget Request	4Q 2002	2Q 2004	1Q 2004	3Q 2007	73,800	75,800

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Project Engineering and Design (PED)			
2002	1,000	1,000	167
2003	3,159 ^b	3,159 ^b	3,319
2004	0	0	592
2005	0	0	81
Construction			
2003	4,444 ^c	4,444 ^c	0
2004	29,674 ^d	29,674 ^d	11,222
2005	30,650 ^{bce}	30,650 ^{bce}	40,527
2006	4,626 ^d	4,626 ^d	15,376
2007	247 ^e	247 ^e	2,516

^a This project was submitted in the FY 2004 President's Request as project 04-R-314. In FY 2003 Congress appropriated construction funds for this project (after the FY 2004 Request was submitted to Congress) under project 03-R-313.

^b PED funding was reduced \$41,000 as a result of the FY 2003 general reduction and rescission. This total reduction/rescission was restored in the FY 2005 request to maintain the TEC and project scope.

^c Construction funding was reduced by \$56,000 as a result of the FY 2003 general reduction and rescission. This total reduction/rescission was restored in the FY 2005 request to maintain the TEC and project scope.

^d Construction funding was reduced by \$176,000 as a result of the FY 2004 rescission. This rescission is restored in FY 2006 to maintain the TEC and project scope.

^e Construction funding was reduced by \$247,000 as a result of the FY 2005 rescission. This rescission is restored in FY 2007 to maintain the TEC and project scope.

3. Project Descriptions, Justification and Scope

This project provides materials and services required to design and construct the proposed Center for Integrated Nanotechnologies (CINT) Facility. CINT is one of the five BES/Office of Science Nanoscale Science Research Centers (NSRCs). It will be operated jointly by Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL). The Center for Integrated Nanotechnologies (CINT) is a U.S. Department of Energy (DOE) line item project that is being carried out as a partnership between Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL) to design and build a world-class user facility for research in nanoscale science. The partnership between two world-class DOE laboratories, each with significant technical expertise and capability in nanoscale research, will provide the best possible facility to the nanoscience research community.

CINT will be a distributed Center that is jointly operated by SNL and LANL. Its primary objective is to develop the scientific principles that govern the performance and integration of nanoscale materials, thereby building the foundations for future nanotechnologies. The distinguishing characteristic of the Center is its focus on exploring the path from scientific discovery to the integration of nanostructures into the micro and macro worlds. This path involves experimental and theoretical exploration of behavior, understanding new performance regimes and concepts, testing designs, and integrating nanoscale materials and structures. This Center works closely with the other NSRCs to ensure that their discoveries are evaluated in the context of integrated functional systems. This approach offers a unique role for the DOE in support of the National Nanotechnology Initiative.

The managements of the Los Alamos and Sandia National Laboratories are committed to develop CINT as a DOE national resource for the advancement of nanoscience and technology. Through its laboratory partnership, CINT will leverage expertise and facilities from both SNL and LANL and make those resources available to the user community. In order to provide a strong central focus for the user community while also providing extraordinary leverage and access to existing laboratory capabilities, the CINT project, in conjunction with its user community, has developed a unique Core/Gateway structure.

The Core Facility (approximately 95,000 gross square feet), which will be constructed in Albuquerque, will be the single point of entry for the CINT user community and will provide the multi-disciplinary research environment needed to explore scientific challenges associated with nanoscience integration. In order to assure open access to the user community, the Core Facility is being constructed on DOE property outside of the Kirtland Air Force Base (KAFB).

In addition to developing the Core Facility, the CINT user community strongly recommended that the CINT project also provide access to the deep and broad resources of both SNL and LANL. The Gateway Facilities at both SNL and LANL are designed to provide the user community with direct access to existing DOE/SC and DOE/NNSA programmatic investments at each laboratory.

The Gateway to Sandia Facility is housed within an existing space in a NNSA building located on the main campus within the KAFB. The Gateway to Sandia, which will provide office and laboratory space for CINT users, is co-located with many of Sandia's existing facilities for nanoscale science research and Sandia's world-class microfabrication facilities. No new construction is required for the Gateway to Sandia since it will utilize existing NNSA space. (While the NNSA facility that houses the Gateway to Sandia is within the KAFB boundaries, it is located outside classified restricted boundaries and is therefore open for general user access).

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Development of the Gateway to Los Alamos Facility (approximately 34,000 gross square feet) involves the construction of a new building on the Los Alamos campus providing the user community direct access to existing nanoscale materials science and bioscience capabilities. The Gateway to Los Alamos Facility is located in the center of the Los Alamos materials science complex which is in an open security environment and will facilitate easy access to these existing nanoscale materials science and bioscience resources. Traditionally, materials science and bioscience have been viewed as separate activities and are housed primarily in separate parts of the Los Alamos campus. The Gateway to Los Alamos will provide a unique research environment for CINT users by combining nanoscale materials science and biosciences capabilities and expertise under one roof surrounded by supporting resources accessible to CINT users.

The CINT project is building a unified community around its Core Facility and two Gateway Facilities (one each at SNL and LANL). The CINT project is using public workshops, presentations at scientific forums, web-based communications, and one-on-one interactions with CINT scientists to help build its user community with significant participation from university, industrial, and laboratory researchers. Input and advice from the user community is used to help define and refine the proper tools and scientific focus to address the challenges of nanoscale science and technology. CINT is focused on *integration* because it is the key factor in the scientific development and application of nanoscience. The tools and resources of CINT will be available at no cost to university, industrial, and laboratory researchers through a peer-reviewed process. The external scientific community has been and will continue to be a vital partner in developing CINT so that it is successful in achieving its vision.

The initial technical focus of the Center will be on the following five thrusts:

- Nanophotonics and Nanoelectronics
- Complex Functional Nanomaterials
- Nanomechanics
- Nanoscale and Bio-Microinterfaces
- Theory and Simulation

This proposed laboratory and office space complex will house state-of-the-art clean rooms and equipment for nanolithography, atomic layer deposition, and materials characterization along with general purpose chemistry and electronics labs and offices for Center staff and collaborators.

The CINT Core Facility will include class 1,000 clean room space for nanofabrication and characterization equipment and class 100 clean room space for lithography activities. This facility will also require general purpose chemistry/biology laboratories, electronic and physical measurement laboratories, office and meeting room space.

The scope of this project is to construct the CINT Core and Gateway to Los Alamos. The engineering effort includes preliminary and final design of both buildings. The project also includes procurement of an initial set of experimental capital equipment and construction of facilities. FY 2003 and FY 2004 construction funds were used for conventional construction and equipment procurement. FY 2005 and FY 2006 construction funds will be used to continue these activities.

4. Details of Cost Estimate ^a

(dollars in thousands)		
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs.....	2,489	2,507
Design Management Costs (1.2% of TEC)	916	806
Project Management Costs (1.0% of TEC)	754	710
Total, Design Costs (5.6% of TEC)	4,159	4,023
Construction Phase		
Buildings.....	37,902	34,415
Improvements to Land.....	1,430	1,430
Utilities	1,722	1,777
Special Equipment ^b	11,667	16,645
Standard Equipment.....	2,194	2,178
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	3,022	3,151
Construction and Project Management (3.4% of TEC)	2,512	1,212
Total, Construction Costs.....	60,449	60,808
Contingencies		
Design Phase (0.0% of TEC)	0	136
Construction Phase (12.5% of TEC).....	9,192	8,833
Total, Contingencies (12.5% of TEC).....	9,192	8,969
Total, Line Item Costs (TEC).....	73,800	73,800

5. Method of Performance

Contracted Architect-Engineering (AE) support was used for development of the design concept and associated narrative and supporting material for the Conceptual Design Report. Design Criteria and other documents required during the conceptual phase for the Core Facility were done by SNL personnel with external support as needed. Title I and II design for the Core Facility was provided by contracted A-E support. The construction contractor was selected using a competitive best value process. The process considered the contractors' qualifications and experience and the quoted price. The resultant contract is fixed price.

Performance specifications have been prepared by LANL staff with contracted support for the Gateway to Los Alamos Facility. A design-build contract was awarded to a construction contractor selected using a competitive best value process. The process considered the contractors' qualifications, experience, and the quoted price.

SNL and LANL personnel are providing project management, design management, and project controls support.

^a This cost estimate is based on direct field inspection and historical cost estimate data, coupled with parametric cost data and completed conceptual studies and designs. Escalation rates are taken from the DOE construction project and operating expense escalation rate assumptions (as of January 27, 2002).

^b Initial research equipment including testing and acceptance.

6. Schedule of Project Funding

(dollars in thousands)

Prior Years	FY 2004	FY 2005	FY 2006	Outyears	Total
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Project Cost

Facility Cost

Design.....	3,486	592	81	0	0	4,159
Construction	0	11,222	40,527	15,376	2,516	69,641
Total, Line item TEC	3,486	11,814	40,608	15,376	2,516	73,800

Other Project Costs

Conceptual design cost	330	0	0	0	0	330
NEPA documentation costs.....	199	0	0	0	0	199
Other project-related costs ^a	271	150	500	550	0	1,471
Total, Other Project Costs	800	150	500	550	0	2,000
Total, Project Costs (TPC)	4,286	11,964	41,108	15,926	2,516	75,800

7. Related Annual Funding Requirements ^b

(FY 2008 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	18,500	18,500
Total related annual funding	18,500	18,500

^a Includes tasks such as Safety documentation, ES&H Monitoring, Operations and Maintenance Support, Readiness Assessment, and Pre-operational Start-up. Experimental research will begin at the time of beneficial occupancy of the facilities. These research costs are not part of the TPC and will be funded by the BES program.

^b These costs are preliminary and based on the conceptual design.